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Dear Committee,

I would like to strongly recommend Dr. Joseph E. Reiner for a faculty job in your department. I have known Mr. Reiner since September 1997, when he arrived as a graduate student to Stony Brook with a graduate assistantship in areas of national need (GAANN). Later, thanks to a special NSF grant, he became an Optics Fellow at Stony Brook. Two years later, in the summer of 1999, he became my graduate student as I was then a member of the faculty of Stony Brook and I moved to Maryland in the fall of 2003. He defended his dissertation at the end of the spring of 2003 with an award from the Provost of Stony Brook. He won a prestigious National Research Council Fellowship to work in biophysics at the National Institute of Standards and Technology under Dr. Kristian Helmerson of the group of the Nobel Prize Dr. William Phillips.

Dr. Reiner was the fundamental player in the very successful project of quantum feedback in my laboratory, a topic selected by the Optical Society of America as one of the highlights of Optics News in 2002. Without his efforts and dedication we would have never reached the level we have now.

Mr. Reiner has a very solid formation in classical and quantum physics. Among the graduate students at Stony Brook, about one hundred and fifty, he strikes me as the best balanced in the three fundamentals for a successful research career: solid theoretical knowledge, good computer-simulation capabilities, and experimental aptitude in the area of interest. He learns very fast and he has broadened his knowledge of biophysics to the extent that he has now been invited to give presentations of his research in international conferences.

During his tenure as my student he brought innovative ideas to the study of fluctuations in quantum optics that culminated in the work on quantum feedback in strongly coupled quantum systems that forms the core of this dissertation. He worked independently in many of the sections of his dissertation, collaborating with three first-class theorists: Prof. Howard Carmichael, then at the University of Oregon, now in New Zealand, Prof. Howard Wiseman from Australia and Prof. Perry Rice from Miami University. He has a paper with Prof. Wiseman on a topic where I had no input.

He constructed a new apparatus for cavity QED experiments that incorporates a laser cooled beam of atoms. He started with an empty room, designed, machined, and constructed the apparatus mostly on his own with some help of a first year student that he has guided and mentored during the process. At NIST he has been involved also with the construction of a new laboratory as the group had to relocate to a new building.

He gives very good talks at conferences and meetings. I asked him many times to substitute me for classes when I was unable to teach; so he has some exposure to teaching undergraduate courses both in the lower and upper division. He prepared the lectures very conscientiously and the students liked his presentations.

Dr. Reiner is very well trained in classical and quantum statistical mechanics and his knowledge of laser trapping and cooling techniques will enable him to attack very interesting problems in the boundary between Biology and Physics. Every week my students and I meet for one hour to discuss recent interesting developments in Physics by presenting in five to ten minutes a recent paper that has caught our attention. Dr. Reiner has often, in the four years that he has been attending the journal club, presented papers in the area between Physics and Biology. Dr. Reiner is cautious about his scientific results, runs lots of tests before he claims a new result, and enjoys discussing them with his lab-mates and myself. Of my past five graduate students that have now Ph D degrees he has the most ease to write scientific papers.

I have continued to interact with Dr. Reiner, he has excellent ideas about high order correlation functions for study of fluctuations in biophysics, and it is in the fluctuations where the singular information resides. His training and contributions to the study of quantum fluctuations uniquely positions him to initiate a strong research program in bio-physics, with a good balance of physics and biology.

Mr. Reiner is a pleasant person, I have enjoyed working side by side with him in the laboratory, and I know his lab-mates also like him. He is determined and very dedicated to science. He has an interest in Rock and Roll and has played bass in a local band. His understanding of Physics is broad, but he also is interested and enjoys technology. He is independent in his scientific judgments and has proposed and carried out experiments and calculations on his own. I would say he has been the best student in Stony Brook doing Atomic Physics in the last three years. Mr. Reiner ranks in the top among the recent atomic physics graduates that I have seen. I would certainly like to see Dr. Reiner as a colleague of mine here at UMD.

Thank you very much for your consideration of this letter.

Yours sincerely,



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